



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,834	07/21/2003	Jean-Marc Karl Edgard Maurice Virgin	HOE-767	9246
20/028	7/5/0	05/12/2008		
Lipsitz & McAllister, LLC 755 MAIN STREET MONROE, CT 06468			EXAMINER THOMAS, LUCY M	
			ART UNIT 2836	PAPER NUMBER
			MAIL DATE 05/12/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

## Application No.

10/626,834

## Applicant(s)

VIRGIN ET AL.

## Examiner

Lucy Thomas

## Art Unit

2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 40-88 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-88 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 40-41, 43-52, 55, 57-72, 78, 79-80, 84, 85-86, and 88 are rejected under 35 U.S.C. 102(b) as being anticipated by Thrash (US 5,801,914). Regarding Claim 40, Thrash discloses a line arrangement for an electrical system (Figures 1-3), the electrical system comprising

a power source connected to a current feed terminal for supplying current and to a second terminal (power source connected to with a current feed terminal (see terminal connected to 18),

with at least one electrical device 26 (26 is a PTC material, schematically represented as resistors in Figure 3) connected to a current delivery terminal (point where conductor 28 is connected to load 26) and the second terminal (see resistors connected to 28 and 30), the line arrangement providing electrical power from the power source to the electrical device and comprising:

an electrical supply line (see supply line connected to 18) running from the current feed terminal to the current delivery terminal and having at least one current-carrying inner conductor 28 electrically connecting the current feed terminal and the

current delivery terminal and at least one electrically isolating protective sheath 32 surrounding the inner conductor (32 surrounds 28),

a detector element 34 (34 can be a conductive/optical fiber) running along the supply line within a protective enclosure (see 32 protective enclosure of 32 surrounding 36),

the detector element having at least one of an optical property and an electrical property, changes of the optical properties being detectable by a detecting means (see 58 connected to 42 in Figure 3),

the detector element being adapted in such a way that the electrical property is irreversibly changed (conductive fiber breaks open) when a local arc originating from the current-carrying inner conductor occurs (see the recited, "will quickly break open if excessive overheating conditions develop such that caused by an electrical arc" in Column 7, lines 3-13, see also, Column 6, lines 54-59, Column 1, lines 47-48, Column 3, lines 8-28), and

an isolating circuit 37 responsive to detecting means and connected to the current feed terminal, the isolating circuit isolating the current-carrying inner conductor from a current source when a change of the electrical property of the detector element is detected by the detecting means (relay switch 44 of safety circuit 37 isolates conductor 28 from current/power source, in case of excessive overheating, column 7, lines 1-1, Column 6, lines 54-59).

Regarding Claim 41, Thrash discloses the line arrangement, wherein the detector element is formed in such a way that it irreversibly deteriorates in its electrical property

under the local effect of heat (Column 3, lines 24-33, Column 4, lines 19-35, Column 6, lines 54-59, Column 7, lines 1-5).

Regarding Claim 43, Thrash discloses the line arrangement, wherein the detector element comprises at least one of electrical property, which is irreversibly changed when the arc occurs (Column 3, lines 24-33, Column 4, lines 19-35, Column 6, lines 54-59, Column 7, lines 1-5).

Regarding Claim 46, Thrash discloses the detector line following one another in a longitudinal direction of the supply line and running transversely in relation to the longitudinal direction of the supply line are spaced apart from one another by a spacing 0..031 inches (Column 3, lines 21, 34 is in close proximity to the conductor 28, 30 such that it severs due to high temperature).

Regarding Claim 47, Thrash discloses that the detector line consists of a material, which irreversibly changes in its electrical and/or optical property when there is local ingress of an amount of heat that can be generated by the arc (Column 3, lines 24-33, Column 4, lines 19-35, Column 6, lines 30-32, Column 6, lines 54-59, Column 7, lines 1-5).

Regarding Claim 48, Thrash discloses that the detector line consists of an insulating material (polyester yarn), which irreversibly changes in its electrical property from a threshold temperature of about 256 degrees Celsius (column 4, lines 33-37).

Regarding Claim 49, Thrash discloses the line arrangement, wherein the detector line is surrounded by an insulating protective enclosure (Column 3, lines 17-21).

Regarding Claim 50, Thrash discloses the line arrangement, wherein the detector element has a carrier on which the detector line is held (Column 4, lines 25-28, stainless steel fiber twisted around a polyester yarn, polyester yarn reads on the carrier).

Regarding Claim 51, Thrash discloses the line arrangement, wherein the detector line is disposed in the form of conducting tracks on the carrier (Column 4, lines 25-28).

Regarding Claims 44-45 and 52, Thrash discloses the fiber twisted around a polyester yarn and in the form of meanders (see Figure 1, Column 4, lines 25-28).

Regarding Claim 55, Thrash discloses the line arrangement, wherein the carrier surrounds the supply line at least partially (34 is in close proximity to 28 and partially surrounds it).

Regarding Claims 57-58, Thrash discloses that the carrier forms part of a protective enclosure for the detector line, and that carrier consists of a material, which irreversibly changes under the effect of the arc originating from the inner conductor (polyester yarn melts at around 256 degrees Celsius, Column 4, lines 34-37).

Regarding Claims 59-60, Thrash discloses that the carrier is connected to the detector line and consists of a material which under the local effect of the arc originating from the inner conductor irreversibly deforms/decomposes (polyester yarn melts around 256 degrees Celsius, Column 4, lines 34-37, Column 6, lines 54-59, Column 7, lines 1-5).

Regarding Claim 61, Thrash discloses that on account of its irreversible change under the local effect of the arc, the carrier irreversibly changes the electrical property of

the detector line (insulation melts and conductor severs, see Column 4, lines 50-56, Column 6, lines 54-59, Column 7, lines 1-5).

Regarding Claim 62, Thrash discloses that the carrier locally interrupts the detector line (insulation melts and conductor severs, see Column 4, lines 50-56).

Regarding Claims 63-66, Thrash discloses that the detector element irreversibly changes/changes its electrical/optical property when it is mechanically damaged (mechanical force/stress when the carrier melts, causes the conductor to sever/open).

Regarding Claim 67, Thrash discloses that the detector line lies in a circuit specific to the detector line (see 34 connection in Figure 3). Regarding Claim 68, Thrash discloses that at least one detector circuit is provided which activates the isolating circuit (see 58 connected to 42, 44 in Figure 3).

Regarding Claims 69-70, Thrash discloses that the detector circuit is associated with the current feed terminal and current delivery terminal (see 42, 44 connections to 40 and 50 in Figure 3).

Regarding Claims 71-72, Thrash discloses that the detector circuit communicates with the isolating circuit by means of an electrical line or by means of light guide (34 can be conducting/optical fiber, therefore communicates electrically/optically).

Regarding Claim 78, Thrash discloses that the detector circuit detects the occurrence of a potential in the detector line other than that of the detector line (overheating is due to arc, which originates at the inner conductor, Column 6, lines 54-59).

Regarding Claims 79-80, Thrash discloses that the detector element comprises a detector line (fiber reads on detecting line), said detector line having an electrical property/optical, changes of said electrical property being detectable by detecting means (see 58 connected to 42 in Figure 3),

said detector line is comprised of a (polymer) material adapted in such a way that at least its electrical properties are irreversibly changed (fiber breaks or fuse together when the polyester yarn melts due to high temperature and the resistance/optical conductivity changes irreversibly changes, also see Column 1, lines 47-48, Column 3, lines 8-28, Column 6, lines 27-32), when a local arc originating from the current-carrying inner conductor occurs (Column 7, lines 1-5, Column 6, lines 54-59).

Claim 84 recites the elements of Claim 40, except that the detector element is limited having at least one electrical property, and Thrash's detector element 34 is a conductive fiber having electrical property (resistance). Therefore, please see the rejections for Claim 40 recited above.

Claims 85-86 basically recite the elements of Claim 40, and additional limitations. Regarding additional limitations, Thrash discloses that the detector element comprises a carrier and a detector line (Column 4, lines 25-28, stainless steel fiber twisted around a polyester yarn, polyester yarn reads on the carrier, fiber reads on detector line), said detector line having an electrical property/optical, changes of said electrical property being detectable by detecting means (see 58 connected to 42 in Figure 3), and the carrier being connected to the detector line and consisting of a material which under the local effect of an arc originating from one of the at least one inner conductor



irreversibly changes/deforms (fiber breaks or fuse together when the polyester yarn melts due to high temperature and the resistance/optical conductivity irreversibly changes), its behavior by exerting mechanical forces acting on the detector line and thus changing said at least one of said optical and electrical properties of said detector line due to the connection of said detector line to said carrier (mechanical force/stress when the carrier melts, causes the conductor to sever/open, Column 1, lines 47-48, Column 3, lines 8-28, Column 6, lines 27-32).

Claim 88 recites the elements of Claim 40, except that the detector element is limited having at least one optical property, and Thrash's detector element 34 is a conductive fiber having optical property. Therefore, please see the rejections for Claim 40 recited above.

3. Claims 53-54, 42, 56, 73-77, 81-82, 83, and 87 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thrash (US 5,801,914) in view of Saito et al. (US 6,243,018). Regarding Claim 53, Thrash does not disclose that the carrier is given in the form of a strip. Saito discloses the line arrangement, wherein the carrier is given the form of a carrier strip (see i2 in Figure 3).

Saito discloses a line arrangement 1 for electrical systems of vehicles (Figure 1, Column 1, lines 10-12), comprising: an electrical supply line running from a current feed terminal to a current delivery terminal and having at least one current-carrying inner conductor (see conductors inside 3, 4, 5, Column 5, lines 59-61) and at least one protective sheath (see outer part of 3, 4, 5, Column 5, lines 46-47) surrounding the inner conductor, a detector element 2 having a carrier, which runs along the supply line, and

Art Unit: 2836

the carrier strip runs helically around the supply line (see Figures 4, 5b). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the line arrangement of Thrash and to provide a carrier strip as taught by Saito, to facilitate easy handling and flexibility with the location of the detector line. Claim 54, Saito discloses the line arrangement, wherein the carrier strip runs helically around the supply line (see Figures 4, 5b).

Regarding Claims 42 and 56, Thrash does not disclose that the detector element surrounds the supply line (Claim 42) or carrier encloses the supply line substantially completely (Claim 56).

Saito discloses a line arrangement 1 for electrical systems of vehicles (Figure 1, Column 1, lines 10-12), comprising: an electrical supply line running from a current feed terminal to a current delivery terminal and having at least one current-carrying .inner conductor (see conductors inside 3, 4, 5, Column 5, lines 59-61) and at least one protective sheath (see outer part of 3, 4, 5, Column 5, lines 46-47) surrounding the inner conductor, a detector element 2 which runs along the supply line comprising a carrier and a detector line, wherein the carrier substantially surrounds the supply line (see Figures 4, 5b). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the electrical system of Thrash and to provide the detecting element enclosing or substantially surrounds the supply line as taught by Saito to provide enough proximity and coverage for the heat transfer to the detector when overheating occurs.

Regarding Claim 73, Thrash does not disclose more than one detection circuit. Saito discloses a line arrangement 1 for electrical systems of vehicles (Figure 1, Column 1; lines 10-12), comprising: an electrical supply line running from a current feed terminal to a current delivery terminal and having at least one current-carrying inner conductor (see conductors inside 3, 4, 5, Column 5, lines 59-61) and at least one protective sheath (see outer part of 3, 4, 5, Column 5, lines 46-47) surrounding the inner conductor, a detector element 2 which runs along the supply line, and a number of detector circuits (see 51-54 in Figure 14) are provided, and the detector circuits communicate with one another to sense a change the electrical property of the detector element. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the line arrangement of Thrash and to provide a number of detector circuit as taught by Saito, to process all the sensed data from all detector line to make a determination to disconnect the supply for the inner conductor.

Regarding Claims 74-75, Saito discloses that the detector circuits communicate with one another via an internal line within the line strand (see Figure 13 and communication lines from 46, 45 to 48), and via an external line outside the line strand (see external communication lines). Regarding Claims 76-77, Thrash discloses communication using an electrical line/optical line (34 can be conductive/optical fiber).

Claim 81 basically recites the elements of Claim 40, and additional detector element to have at least two detector elements. Thrash does not disclose an additional detector element.

Saito discloses a line arrangement 1 for electrical systems of vehicles (Figure 1, Column 1, lines 10-12), comprising: an electrical supply line running from a current feed terminal to a current delivery terminal and having at least one current-carrying inner conductor (see conductors inside 3, 4, 5, Column 5, lines 59-61) and at least one protective sheath (see outer part of 3, 4, 5, Column 5, lines 46-47) surrounding the inner conductor, a detector elements 14, 22 (see Figures 10-11) which runs along the supply line comprising a carrier and a detector line, wherein the carrier substantially surrounds the supply line (see Figures 4, 5b). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the electrical system of Thrash and to provide two detecting elements as taught by Saito, to provide a redundant system (see Saito, Column 7, lines 15-36).

Claim 82 basically recites the elements of Claim 81, and further limiting each detector element comprising a detector line and a carrier strip on which the detector line is held, said carrier strips being wound with opposite winding directions around the supply lines.

Thrash discloses that the detector element comprises a carrier and a detector line (Column 4, lines 25-28, stainless steel fiber twisted around a polyester yarn, polyester yarn reads on the carrier, fiber reads on detector line). Saito does not specifically disclose that the carrier strips are wound in opposite winding directions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination of Thrash and Saito, and to have carrier wound in

opposite directions or the same directions depending on the location of the detecting means or to meet other system requirements.

Claim 83 basically recites the elements of Claim 81, and further that the detector elements enclose the supply line substantially completely. Thrash does not disclose that the detector element surrounds the supply line substantially completely.

Saito discloses a line arrangement 1 for electrical systems of vehicles (Figure 1, Column 1, lines 10-12), comprising: an electrical supply line running from a current feed terminal to a current delivery terminal and having at least one current-carrying inner conductor (see conductors inside 3, 4, 5, Column 5, lines 59-61) and at least one protective sheath (see outer part of 3, 4, 5, Column 5, lines 46-47) surrounding the inner conductor, detector elements 14, 22 (see Figures 9-10) which runs along the supply line comprising a carrier and a detector line, wherein the carrier substantially surrounds the supply line (see Figures 4, 5b). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the electrical system of Thrash and to provide two detecting elements enclosing or substantially surrounds the supply line as taught by Saito to provide detector elements in enough proximity and coverage for the heat transfer from each current carrying conductor to the detector when overheating occurs.

Claim 87 basically recites the elements of Claim 40, and additional limitations. Regarding additional limitations, Thrash discloses that the detector element comprises a carrier and a detector line (Column 4, lines 25-28, stainless steel fiber twisted around a polyester yarn, polyester yarn reads on the carrier, fiber reads on detector line), said

detector line having an electrical property/optical, changes of said electrical property being detectable by detecting means (see 58 connected to 42 in Figure 3). Thrash does not disclose the detector line being arranged between the carrier and a cover foil (covering layer) on the carrier.

Saito discloses a line arrangement 1 for electrical systems of vehicles (Figure 1, Column 1, lines 10-12), comprising: an electrical supply line running from a current feed terminal to a current delivery terminal and having at least one current-carrying inner conductor (see conductors inside 3, 4, 5, Column 5, lines 59-61) and at least one protective sheath (see outer part of 3, 4, 5, Column 5, lines 46-47) surrounding the inner conductor, detector element 2, 12, 14, 22 (see Figures 1, 4, 5-6, 9-10) which runs along the supply line comprising a carrier 13 and a detector line, the detector line being arranged between the carrier and a cover foil of the carrier (see 13, 14 arranged in Figures 5-6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the electrical system of Thrash and to provide the carrier and detector line arrangement as taught by Saito, for efficient heat transfer from current carrying conductor to the detector when overheating occurs.

#### ***Response to Arguments***

4. Applicant's arguments filed on 1/25/2008 have been fully considered.
5. The Applicant states that there is no disclosure or suggestion in Thrash of using such a detector line 34 in a line arrangement for an electrical system of a vehicle, as recited in the preamble. Thrash discloses that the "invention can be implemented in all types of electrical circuits, electrical devices, and power cords, **including, but not**

**limited to** electric blankets, electric heating pads, electric motors, and wiring circuitry for building" (see Column 2, lines 3-8), and therefore, includes the electrical system of a vehicle. Furthermore, it is noted that the limitation, for an electrical system of vehicles, is interpreted as the intended use of the line arrangement, and as such, as long as Thrash's line arrangement is capable of being used for an electrical system of a vehicle, the reference meets the limitation.

Applicant's arguments regarding the limitation of local arcs is not persuasive since the examiner never relied upon the portions of Thrash cited by the applicant in support the limitation.

The Applicant states that in Thrash, the fiber 34 is not designed to detect arcing originating from one of the electrical lines. Thrash, in **Column 7, lines 1-5**, discloses, "conductive fiber 34 will not break open during normal operation..., but will quickly break if excessive overheating conditions develop **such as that caused by an electrical arc.**" That means, conductive fiber breaks open due to any excessive heating, including but not limited to, by an electrical arc. Also, in **Column 6, lines 54-59**, Thrash discloses, in the situation where two breaks occur in either conductor 28 or 30, the voltage drop across one or both breaks is usually very significant, resulting in the creation of an electrical arc. Such an arc, as mentioned above, can generate excessive heat.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy Thomas whose telephone number is 571-272-

Art Unit: 2836

6002. The examiner can normally be reached on Monday - Friday 8:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Sherry/  
Supervisory Patent Examiner, Art Unit 2836

LT  
April 29, 2008